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The Social Control of Science and Technology: Comment

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COMMENT

BY JOHN G. WELLES

PROFESSOR Baram's paper has made a real contribution to my thinking by providing a very helpful framework to work within. The matrix he has developed also suggests an excellent classroom project which we, as teachers, could use to foster enlightened student thinking about the social control of science and technology. An assignment could be given which would require the students to develop a similar matrix on their own with further analysis leading to the development of other useful analytical tools.

My general objection to the paper is that it seemed to place a little too much emphasis on the negative social response — the remedial response — to science and technology without considering that there are also many ways in which society can act affirmatively. The pollution problem provides an example. We might attempt to solve this problem by looking at the composition of the Gross National Product and reducing those specific components of the G.N.P. which pollute the environment. This would be a negative social response. However, I think that it is important to have a growing economy to provide the additional money — tax income and private income — to clean up the environment. Thus we can look to those components of the G.N.P. which produce little pollution. By stimulating these selective components of the G.N.P., the social control of science and technology can be *positively* oriented, and the growth of the economy would not be endangered.

The advocacy of such a position does not exclude the social control of the source of pollution, of course, and this is adequately pointed out in an interesting assessment of the environment developed by Herman Daly, an economist at Louisiana State University.

Mr. Daly acknowledges the efficacy in Adam Smith's theory of the invisible hand, where the self-interest of many producers works to the general public good in the free market — or, as we have it now, a regulated market. But coupled with the action of the invisible hand, he sees at work an invisible foot, kicking the environment, because in the course of the invisible hand working, the producer simply makes use of the air, water, and land to discharge his effluents. This foot needs to be controlled because it will not control itself — conquering the foot may, therefore, be seen as the crux of the whole control problem.

Now, looking specifically at Baram's paper I have several observations to make. In reviewing the controls presently being exercised by society over science and technology, Professor Baram mentioned that retroactivity is inherent in a legal system based on conflicts within the

private sector of society. It is important to recognize that there are also conflicts within the public sector (a good example is the conflict between the Interior Department and the Federal Aviation Administration over the location of a jet airport near the Florida Everglades) in which retroactivity plays as important a role as it does in the private sector.

Because retroactivity makes many of our control systems ineffective, it is doubly important that public interest groups survive. Their function in bringing public pressure to bear on undesirable situations is a *concurrent* function, though these groups, too, when forced to use the legal system, are hampered by retroactivity. It would be a tragedy if the Internal Revenue Service removed the tax exempt status of these groups just because they are making trouble. In view of our discussion it is imperative that they do make trouble.

Perhaps the most disturbing aspect of Professor Baram's paper is his faith in long-range planners. He spoke of creating new administrative bodies at the federal level to better control science and technology but then seemed almost to contradict himself by quoting Hugh Folk as saying that such experts would need extraordinary courage to perform a proper assessment function, since their careers would still be rooted in the same industrial-governmental milieu.

By concentrating control in a few agencies one asks for real trouble. I would rather pay the price of inefficiency, duplication, and a certain amount of bungling under our present pluralistic and confusing system than to concentrate this control in the hands of a few who have a great deal of self-interest in the decision process as well as a vested position to preserve when they do make mistakes.

Professor Baram stated at an earlier point in his paper that, although agencies possess the financial and technical resources, and sometimes the authority, to function as effective social controls, they have, in general, failed to do so. There is an excellent example of such a failure here in Colorado.

This incident concerns the Rocky Mountain Arsenal which, from 1942-1957, disposed of their waste in an open pit. In 1954, a farmer nearby who was irrigating his sugar beets from his well had his crop turn brown. The agricultural experts that he called in diagnosed the trouble as being caused by the chemical 2-4-D. Eventually two secret investigations traced the trouble to the open pit that was draining into the ground water the farmer was using to irrigate his crops. In 1961, the Army admitted the damage and paid the farmer for 3 years loss.

At this point the Army decided to get rid of this waste by drilling a deep well. They went 12,000 feet underground, and in March 1962, they started to force the liquid waste, under pressure, into the deep well. Between April 1962, and December 1965, Denver experienced 710 minor earthquakes.

In 1965, David Evans, at the Colorado School of Mines, investigated this phenomena and theorized that the liquid waste was lubricating a fault into which the deep well had been drilled and was allowing the crust of the earth to slip back and forth. In 1966, the Army stopped using the well when a U.S. Geological Survey study indicated agreement with Evans, while disavowing any connection between its well and the earthquakes. This, I think, was an example of bureaucratic bungling.

To avoid such mistakes in the future, Professor Baram suggests that "[a]dministrative agencies must be reorganized sensibly in light of national needs and available scientific and technological resources." Agency reorganization may be far more desirable than politically feasible. For instance, the Joint Committee on Atomic Energy is so jealous of its power that I doubt whether it would allow the Atomic Energy Commission to be reorganized, as has been proposed, so as to effectuate a diminution of its power; and Congress is both the judge and jury on that decision.

As a further measure to improve agency performance Professor Baram indicated that assessment of environmental damage under the National Environmental Policy Act should be made public. There are two sides to the issue of full disclosure, and I think it warrants further discussion. There are about eight or nine of us here who attended a meeting on technology assessment at Andover, New Hampshire, in August 1969. Considerable discussion centered on whether technology assessment reports should be made fully public because of some of the very things that are mentioned in Professor Baram's paper: the fear of reprisal by the agencies on some of their employees because the employees are going against the self-interest of the director of the agency and the fear that published speculation will lead the public to believe that the agency is not sure of itself.

However, the provision of the Environmental Policy Act, requiring agencies to make assessments of environmental impact, may prove very beneficial, apart from the full disclosure issue.

According to the *Wall Street Journal* of October 27, 1970, under a headline reading, "New Federal Program May Strengthen Effort to Guard Environment: Presidential Council, Recent Law Pressure Agencies to Protect Valued Areas," the Environmental Policy Act had been cited, as of August 1, 1970, in 18 federal court cases, 16 of which were against the government. This act is a very encouraging development and may have a lot more impact than the drafters, or at least the people who voted for the legislation, may have realized.

I do agree with Professor Baram's approach to the method of professional education, in that problem-orientation forces learning,

synthesis, and application onto the student. It is like the Harvard Business School case method that has been in use for many years.

As a final thought, I would suggest that one additional social control be added to Professor Baram's matrix — long-term corporate self-interest.

Robert O. Anderson, Chairman of the Board of Atlantic Richfield, made a speech (reported by *The Denver Post*, Environmental Section, November 1, 1970) to the Institute for International Education in New York recently in which he said that in the automobile and petroleum industries we have placed a great value on the kind of efficiency that results in high speed and fast pick-up. He says we should have been, and must now begin, placing a greater value on the efficient use of energy forms in an attempt to reduce pollution — even if the result is to decrease consumption.

I may be harboring a naive hope, and I do not believe that the general industrialist is ready to make such a far-reaching statement, but industrial statesmen do serve in times of crisis, and I am hopeful that Robert O. Anderson is just the beginning of a long list of industrialists who realize that it will be to their ultimate advantage to protect the environment.